U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Hibiscus dasycalyx*

COMMON NAME: Neches River rose-mallow

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
___ New candidate
_X_ Continuing candidate
___ Non-petitioned
_X__ Petitioned - Date petition received: 11 May 2004
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition requesting a reclassification of a listed species?
FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
Higher priority listing actions, including court-approved settlements, court-ordered statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (http://endangered.fws.gov/) provides information on listing actions taken during the last 12 months.

_X_ Listing priority change
Former LP: _5_
New LP: _2_
Date when the species first became a Candidate (as currently defined): March 24, 1997

___ Candidate removal: Former LP:
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
___ F – Range is no longer a U.S. territory.
___ I – Insufficient information exists on biological vulnerability and threats to support listing.
___ M – Taxon mistakenly included in past notice of review.
___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plant, Malvaceae (Mallow family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Cherokee, Houston, and Trinity counties, Texas

LAND OWNERSHIP: Ten sites with current or historic *Hibiscus dasycalyx* populations are known. Two current sites and one historic site lie within Texas Department of Transportation (TxDOT) rights-of-way and collectively sustained approximately 1 percent (totaling less than 0.5 hectare or 1.2 acres) of the total 2005-2006 population of *H. dasycalyx*. Four sites occur on U.S. Forest Service (Forest Service) land and supported about 81 percent (approximately 6 hectares or 14.8 acres) of known 2005-2006 individuals. Three sites are on private land and supported 18 percent (6.8 hectares or 16.8 acres) of all known 2005-2006 *H. dasycalyx*.

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BIOLOGICAL INFORMATION

Species Description

Hibiscus dasycalyx (Neches River rose-mallow) is a shrubby perennial plant that grows 1-2 meters (3-7 feet) tall with one or more (often many) woody stems per plant. It bears large and showy flowers about 7.5-15 centimeters (3-6 inches) wide, each with five 5-10 centimeters (2-4 inches) long petals. The flowers are usually creamy-white with a deep-red or purple center at the base. The calyx is densely covered with long hairs, distinguishing it from other *Hibiscus* species. The 5-10 centimeters (2-4 inches) long leaves are deeply 3-lobed and arrowhead-shaped, with each lobe linear and slenderly tapering from 2.5-10 centimeters (1-4 inches) at the base to less than 0.5 centimeter (0.2 inch) wide at the tip. Leaf margins are irregular or saw-toothed. It blooms in the summer, generally June to September. The fruit is a rounded capsule generally present July to November. Mature seeds are densely pubescent (hairy) and buoyant in water for several hours.

Taxonomy

Hibiscus dasycalyx was first collected by Ivan Shiller in 1955 near Apple Springs in Trinity County (Klips 1995, p. 1464). Blake (1958, pp. 277-280) described the specimen as a new and very distinct species that appeared to be allied with *Hibiscus coccineus* and *Hibiscus laevis*. He noted that it had leaves "much like those of the former species and corolla more than like that of the latter, but at once distinguished from both of them and from all other United States species by its densely spreading-hirsute [hairy] calyx." Blanchard (1976, pp. 58-60) visited the type location in 1968 and noted that *H. dasycalyx* showed strong affinity with the wide-spread *H. laevis*, but differed from it by having more narrowly lobed leaves and prominently pubescent calyx and fruit. He noted that all 100 plants present at the type location resembled the type specimen (Blanchard 1976, p. 20-27). Plants grown from wild-collected seed also remained consistent, and produced viable seed (Blanchard 1976, p. 31). After his observation of *Hibiscus* species at three sites, Warnock (1995, pp. 38-40) also concluded that the *H. dasycalyx* was a valid species.

Klips (1995, pp. 1465-1467) used enzyme electrophoresis to examine protein polymorphism in allozymes of *Hybiscus dasycalyx, H. laevis*, and *H. moscheutos*. He found that all three taxa were diploid and shared predominant alleles for all enzyme systems except three, which were absent in *H. moscheutos*, but displayed generally identical banding patterns for *H. dasycalyx* and *H. laevis*. He also found variation in leaf shape and calyx pubescence among populations of *H. laevis*, including forms intermediate between typical *H. laevis* and *H. dasycalyx*. Klips concluded that *H. dasycalyx* could be considered a subspecies or variety of *H. laevis*, but still a separate taxon. He noted the occurrence of morphologically intermediate characters in populations where the two species were sympatric.

Clack conducted further genetic testing of *Hybiscus dasycalyx, H. laevis*, and *H. moscheutos* by comparing their DNA (Clack 2003, pp. 1-7). Comparisons were made using Random Amplified Polymorphic DNA (RAPD). However, RAPD was not able to reproducibly generate a fingerprint for all three species (Clack 2003, p. 5). The use of ISSR primers (inter-simple sequence repeat), however, were able to identify differences among the three species. Genetic diversity was significantly different for each species. These results indicate that *H. dasycalyx* is unique in comparison with *H. laevis* and *H. moscheutos* (Mendoza 2004, p. 105).

We have carefully reviewed the above information and have confirmed our conclusion that *Hybiscus dasycalyx* is a valid taxon, distinct from other sympatric *Hibiscus* species. Additional sequences will be tested to further demonstrate similarities or differences between the three species. Knowing the extent of genetic diversity for each *Hibiscus* species is necessary information for the future, since hybridization of certain populations may prove to be an increasing problem.

Habitat/Life History

Hibiscus dasycalyx appears to be restricted to wetland areas that are exposed to open sun (Kennedy et al. 1990, p. 6-7; Scott 1997, p. 10-15). It is generally found growing in open, marshy areas (ponds, sloughs, oxbows) within the immediate floodplain of a permanent stream or river (Blanchard 1976, p. 14; Warnock 1995, pp. 5-20). Areas supporting the plant normally

hold standing water early in the growing season, with water levels dropping, but never drying completely until very late in the growing season. This species appears to have community dominance within the narrow band between high and low water levels in wetlands exposed to the open sun (Scott 1997, p. 15; Scott and Creech 1997, p. 10). The species is a perennial with some-to-many woody stems. However, the upper parts of the plant die back each year after blooming, and new growth is produced in the spring. Blooming occurs generally June to September. Fruit is generally present July to November (Scott 1997, p. 33). The species is apparently self-fertilizing (Blanchard 1976, p. 20).

Historical Range/Distribution

Hibiscus dasycalyx was first collected in a shrubby marshland west of the Neches River near Apple Springs in Trinity County (Klips 1995 p. 1463). Local botanists continued to monitor the type location and conducted an extensive search for additional populations through 12 counties (Kennedy et al. 1990, pp. 3-6; Warnock 1995, pp. 3-10). In 1991, a second population was found near Lovelady in Houston County (32 miles southwest of the type location) where about 50 plants were situated along the margin of a small stock pond (Warnock 1995, p. 23-25); this population was later extirpated. Information from specimens in the herbaria of Sam Houston State University and Stephen F. Austin State University (SFASU) suggested the existence of two other populations, but these were never relocated (Klips 1995, p. 1464). Jason Singhurst, botanist with the Texas Parks and Wildlife Department (TPWD), discovered the plant at a Cherokee County site in 1992 (Warnock 1995, p. 22). These three locations represented three separate counties (Cherokee, Houston, Trinity) and three different watersheds (Angelina, Neches, Trinity Rivers), suggesting a relatively wide historical range (Warnock 1995, pp. 32-40).

Current Range/Distribution

In recent years, *Hibiscus dasycalyx* has been documented at 10 sites, but is now considered extirpated from at least 1 of these sites and has not been found recently at 2 others.

Population Estimates/Status

The total number of individuals was estimated to be 1,400 at 4 sites in 2006. However, high water due to heavy rains prevented adequate surveys at most *Hibiscus dasycalyx* sites in spring and summer of 2007, including three unconfirmed sites that staff at the Davy Crockett National Forest had planned to investigate for the *H. dasycalyx* (Phillips 2007a). About 900 blossoms or seed-pods were seen at one private land site and approximately 150 seed pods were seen at an introduced site on Forest Service land in 2007. No population estimates were conducted at any of the sites in 2008 or 2009. Information regarding the currently known distribution of this taxon and population estimates are summarized below.

Table 1. Summary of current population estimates for *Hibiscus dasycalyx* (see text below for details and citations).

County/Site	Most Recent Population Estimate	Year of Estimate

Cherokee County – ▪ Ponta Highway 204 ROW site on Mud Creek (2.5 square meters or 26.9 square feet)	0	2008
Houston County – ▪ Lovelady Highway 230 ROW (0.5 square meters or 5.4 square feet) ▪ Lovelady private land site (adjacent to Highway 230 ROW site) (2.2 hectares or 5.4 acres) ▪ Davy Crockett National Forest, Compartment 55 (3 hectares or 7.4 acres) ▪ Davy Crockett National Forest, Compartment 16 (1 hectare or 2.5 acres) ▪ Davy Crockett National Forest, Compartment 20 (1 hectare or 2.5 acres) ▪ Davy Crockett National Forest, Compartment 11 (1 hectare or 2.5 acres)	0 900+ 1000+ 50 150 10	2005 2007 2006 2006 2007 2006
Trinity County – ▪ Champion site near White Rock Creek (west Trinity County) (2.6 hectares or 6.4 acres) ▪ Highway 94 ROW and roadside park site (near Neches River, east Trinity County) (0.4 hectare or 1 acre) ▪ Temple-Inland site (east Trinity County) (2 hectares or 4.9 acres)	300 0 0	2001 2007 2005
Total Estimated Number of Plants	1050	

Cherokee County - Ponta Highway 204 right-of-way (ROW) site on Mud Creek: Only one *Hibiscus dasycalyx* was seen regularly at this site during years 1993-2000 (Poole 2001, p. 2). Five plants were seen in 2001, one in 2002 and 2003, but none in 2004 and 2005. In August of 2007, a mixture of several hundred *H. dasycalyx, H. laevis*, and *H. moscheutos* plants were present at the first bridge on both the north and south sides of the creek and extended into the adjacent private land (Clack 2010). No information is available for 2008. No Hibiscus plants were present in 2009 due to mowing and spraying (Clack 2010).

Houston County - Lovelady Highway 230 ROW site near Tantabogue Creek southwest of Lovelady: This site supported an average of 3 plants during years 1993-1997, 13 in 1998, 14 in 1999, 8 in 2000, and 4 in 2001. No plants were seen in 2003–2005 (U.S. Fish and Wildlife

Service (Service) 2003, 2004, 2005). No information is available for the following years.

Lovelady private land site adjacent to Highway 230 ROW site: The area supports an average of 300 plants (years 2001-2005) along a wide drainage-way. A total of 900 blossoms or seed-pods were seen in July 2007 (Service 2007, p.1). The population was reported as stable, with no problems noted, based upon a 2008 site visit (Olenick 2009).

Davy Crockett National Forest, Compartment 55, at south end of Forest Road 503: This site was discovered in 2003 (Service 2003 p.1). The population is large with over 1,000 plants estimated in 2006 (Phillips 2007b, p. 4), but has not yet been fully surveyed.

Davy Crockett National Forest, Compartment 16: In year 2000, about 400 plants were introduced into this site. The hydrology of the large wetland at this site was altered with the loss of a beaver dam and its re-establishment at a different location about 200 feet upstream and just upstream of the introduction area. This resulted in a reduced water level at the primary introduction site. In 2003, only 78 plants were seen, all of them clustered near the new beaver dam, where deeper water remained (Griffith 2003, p. 3). About 40 plants were seen in 2004 and 2005 (Service 2004, 2005). Other threats have suppressed this population to 40-50 plants (Phillips 2007b, p.7).

Davy Crockett National Forest, Compartment 20: In year 2000, about 350 plants were introduced into this area. As of 2006, the site continued to support about 300-400 plants (Phillips 2007b, p.3). Only 150 seed pods were noted in 2007 (Service 2007, p.1).

Davy Crockett National Forest, Compartment 11: In September 2004, about 200 plants were placed along parts of a 10-acre wetland (Service 2004, p.1).

Trinity County - Champion site on private land near White Rock Creek in west Trinity County): This area supported about 300 individuals in 2001 (Service 2002, p.1). However, ownership of this site has changed, and its current status is unknown.

Highway 94 ROW and roadside park site near Neches River in east Trinity County: This site supported an average of 35 *Hybiscus dasycalyx* plants for years 1993-1995, 15 in 1996-1998, 49 in 1999, 17 in 2000, and 15 in 2001 (Poole 2001, p.5). The number of stems ranged from 25 to 200, but averaged 103 for years 1993-1999. The number of flowers/fruits averaged 176 for years 1993-1999. In 2001, five hybrids, along with 10 *H. moscheutos* plants and four *H. laevis* plants, were observed in an area left un-mowed by maintenance personnel. By request, the Texas Department of Transportation (TxDOT) removed these plants, and completed an experimental mowing of one section of the ROW. This site has not been thoroughly surveyed since then, but about 20 *H. dasycalyx* plants, and no hybrids, were seen here in 2005 (Service 2005, p.1). No *H. dasycalyx* were seen here in 2007, and the site has again become over-grown with invasive plant species (Creech 2007). TxDOT maintenance personnel removed the tallow and sweetgum by hand from this site in the fall of 2008 (Adams 2009).

Temple-Inland site on private land owned by Temple-Inland Corporation near Highway 94 ROW site in east Trinity County: When initially surveyed in 2001, this site supported more than 300 plants within a large, managed wetland. However, less than 100 were observed in 2002, about 20 in 2003 (Service 2003, p. 1), and none in 2005 (Service 2005, p.1). This wetland is probably now too dry to sustain *Hibiscus dasycalyx*.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Historical habitat has been affected by wetland drainage and loss, conversion of floodplain depressions and oxbows to stock ponds, stream channelization (reducing riparian depressions), road construction, timber harvesting causing loss or degradation of adjacent small wetlands, shrub removal by mowing, cattle grazing around small wetlands resulting in soil compaction and trampling of plants, and herbicide use (Kennedy and Poole 1990, p. 3).

Threats to current habitat include: wetland drainage or conversion to stock ponds; herbicide use on private lands by ranchers and along powerline ROWs by TxDOT (this is becoming a frequent practice); grazing; and mowing. One population, of about 50 plants, was found in 1991 on the south side of Highway 230 southwest of Lovelady along a stock pond. This population was gradually lost to herbicide use and soil compaction by cattle (Warnock 1995, pp. 33-34). The Highway 230 ROW site was also impacted by herbicide use in 2000, reducing the number of *Hibiscus dasycalyx* from a high of 14 in 1999 (Poole 2001, p. 5) to apparently none in 2005 (Service 2005, p.1). The Texas Department of Transportation has been increasing their use of herbicides to remove vegetation in ROW areas because it is less expensive than mechanical mowing (Miller 2005, p.1). A shift in the flooding regime has had a detrimental effect on *Hibiscus dasycalyx* on the Temple-Inland tract and at one Forest Service introduction site (Service 2003, 2004, 2005). The Lovelady private land site has been impacted by cattle grazing as well, causing soil compaction and trampling of plants (Service 2005, p.1). The Cherokee site is scheduled for inundation by the Eastex reservoir in 2011, eliminating any possibility of restoring *Hybiscus dasycalyx* to the area (Frye and Curtis 1990, p. 43).

According to the Intergovernmental Panel on Climate Change (IPCC) average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1,300 years (IPCC 2007, p. 1). It is very likely that cold days, cold nights and frosts have become less frequent over most land areas and hot days and hot nights have become more frequent over the past 50 years: (IPCC 2007, p. 1). It is also likely that heat waves have become more frequent over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007, p. 1).

The IPCC (2007, p. 6) predicts that changes in the global climate system during the 21st century are very likely to be larger than those observed during the 20th century. For the next two decades a warming of about 0.2°C (0.4°F) per decade is projected (IPCC 2007, p. 6). Afterwards, temperature projections increasingly depend on specific emission scenarios (IPCC 2007, p. 6). Various emissions scenarios suggest that by the end of the 21st century, average

global temperatures are expected to increase 0.6°C to 4.0°C (1.1°F to 7.2°F) with the greatest warming expected over land (IPCC 2007, p. 6-8). The IPCC says it is very likely hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007, p. 8).

A warmer climate with more extreme precipitation events may adversely affect *Hibiscus dasycalyx* by altering the wetland habitat the species is known to occupy. It may also improve habitat conditions for invasive plant species and/or for plants.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
Members of the *Hibiscus* genus are of high horticultural interest, but no over-utilization threats are currently known for *H. dasycalyx*.

C. Disease or predation.
Although the first foliage of the year is often consumed by insects before mid-summer, *Hibiscus dasycalyx* plants regularly produce a second crop of leaves which are not eaten, so predation is not generally seen as a major threat. However, in 2001, about 90 percent of *H. dasycalyx* leaves at the Lovelady site showed evidence of insect herbivory. Although we do not consider insect-related impacts to be a threat factor at this time, the potential effect of insects on reproductive success at this site is unknown and should be investigated. In 2006, less than a dozen plants were evident at the Compartment 11 site on Forest Service land and all exhibited signs of wilt and insect predation (Phillips 2007b, p.5).

D. The inadequacy of existing regulatory mechanisms.
There are no existing Federal regulatory mechanisms to protect *Hybiscus dasycalyx* and its habitat, including on U.S. Forest Service lands. Davy Crockett National Forest has been supportive and fully cooperative with the Service regarding informal protection for the three introduced populations and one new population. However, no Candidate Conservation Agreements (CCAs) have been developed to date to ensure formal protection measures.

All other *Hybiscus dasycalyx* sites are on private land or within State (TxDOT) highway right-of-ways. Management agreements which restrict herbicides and mowing have been developed for specific ROW sites that support sensitive plants. The Highway 94 ROW site has been mistakenly mowed during the flowering season and has been impacted by drift of herbicides applied to an utility ROW during *H. dasycalyx*'s growing and blooming season (Poole 2001, p. 4). The Lovelady ROW site has been impacted by the overspray of herbicides from the adjacent private property (Poole 2001, p. 4, TPWD 2009, p. 2). Also, utility companies use herbicides to maintain their power line ROWs that are located within TxDOT ROWs (TPWD 2009, p. 2). Moreover, all three ROW sites remain vulnerable to herbicide drift from adjacent private lands (Service 2005, p.1).

In general, plants on private lands receive little protection unless the landowner is willing to establish such protections. Protection measures for all plants are limited in Texas because of the large proportion (97 percent) of private land and the general lack of state-level laws or regulations involving activities that impact the species and its habitat. Currently, there are no restrictions on the use of herbicides near populations on private land. Although Candidate

Conservation Agreements had been developed for two sites on private land, the landowners were not legally bound to follow all provisions. During the time the CCA for the Temple-Inland population was in place, the quality of habitat and the number of *Hibiscus dasycalyx* at the site declined, partly due to drought but also due to the role of the wetland. The wetland that had supported *H. dasycalyx* is used to maintain water levels in an adjacent larger wetland. The management of this larger wetland took precedence over the smaller one (Dietz 2003). A CCA was also developed and put into place for the Champion site, a high-quality location that supported a healthy population of the species. However, International Paper acquired Champion in 2001 and sold most of its land. Both CCAs have now expired. The timber manager for the new landowner of this site (Meridian Forestry) contacted the Service in February 2008 to request information on the *H. dasycalyx* and on the expired management agreement for this site. The current status of this *H. dasycalyx* population remains unknown.

The Cherokee County population on private land along Mud Creek was probably extensive at one time due to the many depressional wetlands along a wide, shallow area. However, this site will be inundated by the 10,000-acre Eastex reservoir, which is scheduled to be completed by 2011. The Angelina and Neches River Authority will own and operate the reservoir (*http://www.lakeeastex.org*, accessed April 13, 2009).

E. Other natural or manmade factors affecting its continued existence.
All populations of *Hybiscus dasycalyx* are currently at risk of genetic swamping by invasion of two other sympatric *Hibiscus* species, which appear to be better adapted to human disturbance. In 2001, TPWD and the Service recorded signs of active hybridization at the Highway 94 site. Five hybrids, along with ten *H. moscheutos* plants and four *H. laevis* plants, were observed in an area that was frequently mowed (Poole 2001, p. 6) Hybridization is so prevalent at the Ponta site that any "true" *H. dasycalyx* has likely been eliminated. Hybridization has not been a problem at other *H. dasycalyx* sites to date because no *H. laevis* or *H. moscheutos* have been seen at those sites. The Forest Service introduction sites were searched for these two species before they were approved for this use. However, if either of these two *Hibiscus* species should appear at a *H. dasycalyx* site, the genetic integrity of this plant could be compromised very quickly.

About 75-100 *Hisbiscus* plants lying beneath the Mud Creek bridge were found in 2003 were found to represent a hybrid swarm with wide variation in morphology (Poole and Singhurst 2003, p. 3), some resembling *H. laevis* and some *H. dasycalyx*. In the past, the *H. dasycalyx* population along Mud Creek on the adjacent private land was probably extensive. However, only hybrids are evident there now (Poole and Singhurst 2003, p. 3; Creech 2007, p.1). The rapid ease with which these three species hybridize with each other was the primary reason for the genetic assessment that was conducted by SFASU. The genetic integrity of *H. dasycalyx*, in relation to the two other sympatric *Hibiscus* species, needed to be confirmed before any further recovery actions could be implemented. The work by SFASU has assured us that *H. dasycalyx* is a separate species (Mendoza 2004, p. 105). However, the similarity of this species with *H. laevis* and *H. moscheutos* indicates that hybridization could occur very rapidly and extensively should these species ever invade *H. dasycalyx* sites (Clack 2003, p. 6, Mendoza 2004, p. 106).

Extreme drought (the worst ever recorded in Texas) in east Texas during years 1998-2001

resulted in stunted plants and erratic flowering and fruiting. Most sites that supported flowering held some water in the beginning of the season, but soon dried, probably reducing fruiting success. Rainfall returned in 2002, resulting in improved survival and reproduction (Service 2002, p.1). Short-term, but persistent, droughts have continued to occur during sensitive parts of the species' life cycle each year since then, undoubtedly reducing the reproductive capacity of the species, and maintaining low numbers, at most sites. Long-term drought would have a highly detrimental effect on a species so dependent on adequate wetland conditions during the spring and early summer.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

1. An *ad hoc* recovery team that included the Service, TPWD, the Forest Service, The Nature Conservancy of Texas (TNC), SFASU, and private industry, met annually from 1999 until 2007. This informal team, usually consisting of just one representative, normally the species expert, from each of these agencies, discussed the status of *Hibiscus dasycalyx* and implementation of possible recovery measures. The Service initiated these meetings and generally used them to acquire guidance and consensus for proposed recovery activities, such as the Forest Service introductions.

2. With partial funding from National Fish and Wildlife Foundation, SFASU completed a genetic analysis of the *Hibiscus dasycalyx* and its related species, based on plant tissue collected from known sites in summer 1998 (Mendoza 2004, p. 23). SFASU is continuing a study of the species' habitat needs based on experimental plantings at a site on Mill Creek in Nacogdoches County. Finally, they are continuing to propagate plants for potential reintroduction efforts.

3. TPWD has management agreements in place with TxDOT to protect three right-of-way populations (Lovelady, Ponta, Highway 94). However, population numbers at all three sites have continued to decline due to herbicide use or accidental mowing by maintenance personnel (Poole 2001, p. 5).

4. Davy Crockett National Forest represents the only Federal land within the range of the *Hibiscus dasycalyx*. Using aerial photos and site visits, the Service identified three wetland sites that supported favorable wetland habitat. Davy Crockett National Forest personnel have supported reintroduction of plants into all three sites. In 2000 and in 2004, nearly 1,000 plants from SFASU's facilities were placed within Davy Crockett National Forest, with the help of SFASU, the Service, TPWD, the Forest Service, and TNC. At least two of these populations have displayed relatively high survival and reproduction.

5. The Service developed a CCA with Temple-Inland Forest Products Corporation (east Trinity County) for the population found on its land. The agreement allowed for future protection for the current population and the possibility of reintroductions of the species in additional sections of their property. The agreement expired August 27, 2006 and has not been extended.

6. In January of 1998, the Service entered into a CCA with Champion International to protect the population found on their land in west Trinity County. However, in mid-2001 Champion was bought and absorbed by the International Paper Corporation. Most of Champion's lands were immediately listed for sale, including the *Hibiscus dasycalyx* site. The new land manager for this site contacted the Service in 2008 but no activity has occurred since then.

7. In 2004, the Natural Areas Preservation Association (name since changed to Texas Land Conservancy) purchased the Lovelady private land site, located southwest of Lovelady in Houston County. This acquisition continues to secure at least one stable population of *Hibiscus dasycalyx*.

8. A large population was discovered in 2003 on Forest Service land, Compartment 55. This site has not yet been fully surveyed. However, there is no current land-use of the area except hunting. Therefore, this population is expected to remain stable in future years.

9. Seeds of the species have been collected and distributed to two arboretums and to the U.S. Department of Agriculture seed bank in Fort Collins, Colorado, for permanent storage.

SUMMARY OF THREATS: This species is threatened by destruction, modification, or curtailment of its habitat and range as a result of herbicide use on ROWs and private land, shrub removal by mowing, cattle grazing causing soil compaction and trampling of plants, wetland drainage and filling, wetland conversion to stock ponds, and hybridization with other mallow species. In addition, existing regulatory mechanisms have not been adequate to ensure the maintenance of populations at the limited number of sites occupied by the species. Management agreements for ROW sites have not been sufficient to protect the species at three sites. A CCA has not been effective for maintaining the population at one site. The status of another site previously protected by a CCA is unknown at this time. The level of protection that the Forest Service will be willing to commit to for introduced species is currently unknown. The species is highly vulnerable to hybridization with two sympatric *Hibiscus* species. Long-term drought or changes in the water regime at existing sites would be very detrimental to the species.

We find that *Hybiscus dasycalyx* is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES: Future recommended measures should include wetland preservation, restrictions on herbicide use, reductions in cattle use, and restrictions on mowing and shrub removal along wetlands.

LISTING PRIORITY

THREAT			

Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2**
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate To Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number

Magnitude: The magnitude of threat is high at this time. Only one site, on Forest Service land, supports a population of over a 1,000 as of 2006. Another Forest Service site supports a stable population of about 350 individuals after an introduction effort. Two more introduction sites in Davy Crockett National Forest have maintained only small numbers (total of 60). These populations on Forest Service lands should remain stable in the short-term since no change in habitat management is expected. One private land site totalled about 900 blossoms in 2007. The status of one previously healthy population on private land covered by a CCA is now unknown due to a change in ownership. The Temple-Inland population has drastically declined due to an altered water regime. All right-of-way populations are either small (Highway 94) and are threatened by spraying and mowing or have been extirpated.

Imminence: Threats are imminent at this time. Although, the Lovelady site is now protected through purchase by land trust, grazing remains a factor. The Temple-Inland site has declined severely due to a change in hydrology. The current condition of the former Champion site is not known. Two ROW populations have been extirpated, but numbers of individuals have always been low at these sites. The Highway 94 ROW site has been reduced to zero and remains vulnerable to ongoing mowing and herbicide use.

Rationale for Change in Listing Priority Number: The immediacy of threats section was not addressed properly in the species assessment and listing priority form prepared for previous candidate notices of review. Proper interpretation reveals that threats, of high magnitude, are currently occurring and are, therefore, imminent. Accordingly, we have changed the LPN from 5 to 2.

__X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? NoA land trust organization has purchased another site to protect the species. A large population was discovered in 2007 on Forest Service land. At least one introduction area is doing well, and the Forest Service supports additional plantings. Greenhouse plants at SFASU are available for additional introductions. Habitat studies at SFASU are continuing. Therefore, we conclude that no emergency listing is warranted at this time.

DESCRIPTION OF MONITORING: Conservation of this species has involved the Service, TPWD, the Forest Service, TNC, Texas Land Conservancy, SFASU, and private industry. The Forest Service has monitored the status of populations on their lands. TPWD also assists when possible in annual visits to all known sites. Until the retirement of a key staff person in October of 2008, the Service had assumed primary responsibility for monitoring all sites and tried to conduct annual visits. The Service will be able to resume annual monitoring once this key position is filled. Temple-Inland also allows the Service full access to monitor their population.

COORDINATION WITH STATES:

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: In August 2005 and March 2007 the Arlington Field Office contacted TPWD and requested information on the status of this species. In October 2005, TPWD agreed this species should remain a candidate species. In April 2007, TPWD indicated that they had no new information to contradict candidate status for this species (TPWD 2007). The Clear Lake office requested any new information from TPWD regarding the *Hibiscus dasycalyx* in January 2008, but received no response. In March 2009, TPWD stated that the Service assessment of this species was appropriate (TPWD 2009). TPWD indicated in March of 2010 that they had no new information concerning this species (Gordon 2010). *H. dasycalyx* is not part of the State Wildlife Action Plan.

Indicate which State(s) did not provide any information or comments: None.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____ May 21, 2010

Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ Date: October 22, 2010

ACTING

Director, Fish and Wildlife Service

Do not concur: _____ _____

Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010
Conducted by: Edith Erfling